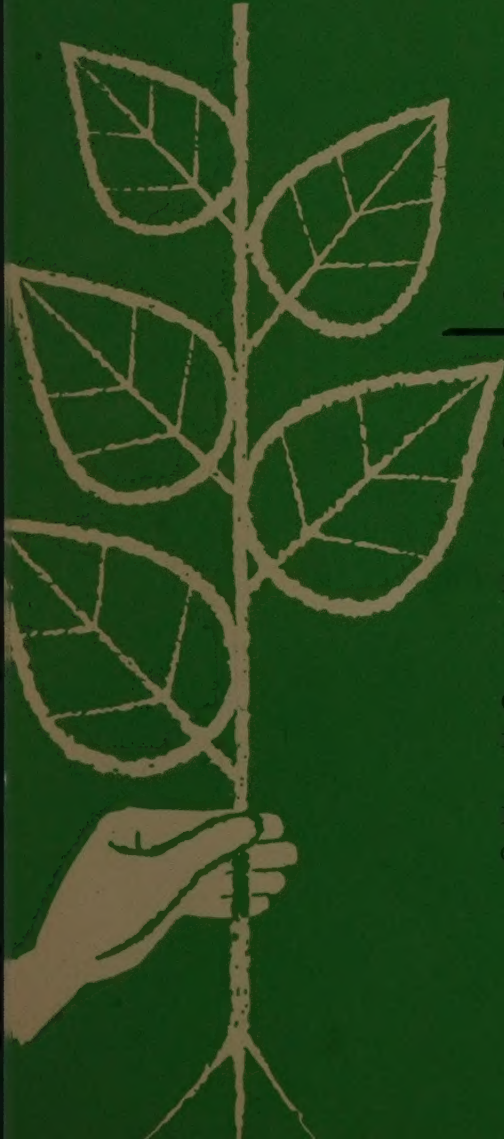


**FAO**FOOD AND AGRICULTURE  
ORGANIZATION OF THE  
UNITED NATIONS - ROME**PLANT PROTECTION  
BULLETIN**A PUBLICATION OF THE WORLD REPORTING  
SERVICE ON PLANT DISEASES AND PESTS**11****CONTENTS**

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## FAO PLANT PROTECTION BULLETIN

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is issued as a medium for the dissemination of information received by the World Reporting Service on Plant Diseases and Pests, established in accordance with the provisions of the International Plant Protection Convention, 1951. It publishes reports on the occurrence, outbreak and control of pests and diseases of plants and plant products of economic significance and related topics, with special reference to current information. No responsibility is assumed by FAO for opinions and viewpoints expressed in the Bulletin.

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# FAO PLANT PROTECTION BULLETIN

A PUBLICATION OF THE WORLD REPORTING SERVICE ON PLANT DISEASES AND PESTS

## Occurrence of a New Sunflower Disorder in Yugoslavia

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A sunflower disease, obviously hitherto unrecorded, occurred in Yugoslavia in 1959 with great severity and has caused much concern among growers. It spread rapidly in some important sunflower-growing areas in the People's Republics of Serbia and Croatia. Outbreaks were severe, especially in the Vojvodina and the Slavonia regions, where sunflower cultivation was extensive. In the neighborhood of Osijek, in many fields, nearly every sunflower plant was affected. Equally extensive attacks were also recorded near Zrenjanin and later in the region of Pomoravlje (Čuprija and Aleksinac) and elsewhere. It was reported that the same disorder had been observed in neighboring Hungary and Romania near the Yugoslav frontier.

The disease was most serious from May to July and it showed such destructive effects that some farmers were prepared to plow under the sunflower and replace it with other crops in order to avoid a complete loss.

Investigations to establish the nature of the disease were initiated immediately after the outbreaks. The symptoms of the disease first suggested that it might be caused by the sunflower mosaic virus, which was reported to be very destructive to sunflower in Argentina and U.S.S.R. (1,2,3). Another possibility under discussion was the injurious effect of aphids which were found in great numbers on sunflower at that time. The present note summarizes the result of observations and preliminary investigations on this disease.

### Symptoms

The severity of symptoms varies to a certain extent with the time when infection takes place. On young plants, on which the most pronounced symptoms develop, irregular chlorotic spots and yellow mottling are scattered over the leaves. Along the veins, shiny yellowish lesions

often appear (Figure 1). Uneven thickening of veins results in the deformation of leaves.

When fully developed leaves are affected, they become markedly deformed, with thickened and twisted veins and a corrugated and curled surface (Figure 2). Severe infection may also cause the thickening and torsion of petioles, and the upward rolling of leaves which eventually become brittle and can be torn easily.

The youngest leaves near the inflorescence on an infected plant show chlorosis, thickening and irregularity in shape (Figure 3). The upper parts of floral bracts are covered with



Figure 1. A young sunflower leaf affected by a disorder of unknown origin in Yugoslavia, showing chlorosis along the veins.



Figure 2. A mature sunflower leaf affected by the disorder in Yugoslavia, showing marked deformation with thickened and twisted veins and a corrugated surface.



Figure 3. An inflorescence with surrounding young leaves from a sunflower plant affected by a disorder in Yugoslavia, showing chlorosis of flower bracts, and chlorosis and deformity of young leaves.

chlorotic lesions. The growth of the stem is usually not impeded, but its top part may become twisted.

## Transmission studies

### TRANSMISSION BY APHIDS

The upper parts of a diseased sunflower plant, including the inflorescence, are usually heavily infested by aphids. These aphids were identified as the following species:<sup>1</sup> *Aphis fabae* Scop., *A. evonymi* F., *Cerosiphia gossypii* Glov., and *Brachycaudus helichrysi* (Kalt.).

In the preliminary transmission studies, these four aphid species were collected from diseased sunflower plants and transferred to young healthy sunflower plants, at the rate of 10 to 15 insects to each plant. After two weeks, the plants were sprayed with parathion to destroy all the aphids. Those inoculated plants were kept in the laboratory two months for observation.

Of the inoculated plants, 38 percent developed disease symptoms similar to those observed in the field, including the occurrence of chlorotic areas and deformation of leaves. Since the aphids used for inoculation often consisted of mixed populations, it could not be ascertained as to which species was actually responsible for the development of such symptoms. After the destruction of the aphids, new symptoms ceased to develop and after two months all the affected plants recovered and had a nearly normal appearance.

### TRANSMISSION BY SAP

Mechanical transmission of the disease was attempted with sap expressed from diseased leaves from Osijek, Razanj and D. Mutnice (Paracin). Carborundum was added to the expressed sap. The inoculation was carried out in the greenhouses at the Faculty of Agriculture, Zemum-Belgrade, during June and July 1959. In addition to a large number of sunflower plants, three to five plants each of the following species were inoculated: *Phaseolus vulgaris*, *Nico-*

<sup>1</sup> The aphids were identified by Dr. K. Heinze, Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für gärtnerische Virusforschung, Laboratorium zur Erforschung der Virusüberträger, Berlin-Dahlem, to whom the writer wishes to express his appreciation.

*tiana tabacum* var. *virginia*, *N. glutinosa*, *Datura stramonium* and *Cannabis sativa*. Later, tobacco plants of variety Ravnjak were also included.

The inoculated plants were kept under observation for three months but none of them developed disease symptoms. One Virginia tobacco plant became infected with cucumber mosaic, which obviously was a contamination.

#### TRANSMISSION BY SEED

Seeds of sunflower variety Novosadski 4 were obtained from Osijek and Dalj. In both cases they were derived from fields with plants completely affected by the disease. The seeds were densely sown in the greenhouses and the plants were under observation for one and a half months after germination. Of the 1,610 plants originating from Osijek and the 1,551 plants from Dalj, none developed any disease symptoms.

#### Serological tests

In order to determine if virus was present in the diseased plants, preliminary serological tests were undertaken. For the preparation of the antiserum, the sap from diseased sunflower plants was clarified by the addition of sodium hypophosphate and centrifugation. It was then precipitated from the supernatant fluid with a saturated solution of ammonium sulphate and re-dissolved in saline. The antigen was injected intramuscularly into rabbits at intervals. For control, in addition to a serum formed with sap of healthy sunflower plants, antisera prepared from cucumber and tobacco mosaic viruses were used.

In the precipitation tests with crude juice from diseased sunflower plants, there were no specific reactions observed. Also only negative reactions were obtained in the controls.

#### Discussions

The sunflower disease which was prevalent in Yugoslavia in 1959 shows symptoms similar to

those caused by sunflower mosaic virus. Results of preliminary investigations, however, indicate that this Yugoslav disease is probably not related to the mosaic virus found in Argentina and U.S.S.R.

According to Traversi (3), sunflower mosaic virus in Argentina is readily transmitted by sap inoculation and also by seed, the percentage being as high as 43 percent. In Yugoslavia, attempts to transmit the disease by mechanical inoculation and seed were both unsuccessful.

Traversi (3) also found that the sunflower mosaic virus was transmissible by *Thrips tabaci*, *Myzus persicae* and *Trialeurodes vaporariorum*. These three insects do not occur on sunflower in Yugoslavia. On the other hand, sunflower was heavily infested in Yugoslavia by several species of aphids, including *Aphis fabae*, *A. evonymi*, *Cerosiphia gossypii* and *Brachycaudus helichrysi*, especially during June and July, when the disease was also most prevalent.

In preliminary experiments, sunflower plants artificially inoculated with those aphids produced symptoms similar to those observed in the field. However, the symptoms ceased to develop after the aphids had been killed, and the affected plants eventually recovered. This appears to indicate that the disorder might be due to the direct injury effect of aphids rather than an insect-transmissible virus. The production of a toxin by insect feeding could be a possibility.

In nature, the relation between the disorder and the aphid infestation is also evident. Both were prevalent in June and July. The affected plants in the field tended to recover when the aphid population decreased. It was also observed that early sown sunflowers, which were severely infested by aphids at their early stages of development, suffered more profound injury from the disorder.

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## Notes on Cotton Diseases in Peru

C. Bazán de Segura, Comité de Defensa Técnica del Algodón, Lima

The major cotton-growing areas in Peru are located in the coastal belt, but cotton production is becoming increasingly important in some valleys of the departments of Amazonas and San Martín in the northwestern tropical forest areas.

Because of their climatic requirements, the long and fine staple cotton varieties, such as Pima, Karnak, and other upland varieties, are grown in the north on the coast as well as in the forest area. Tangüis, a semi-coarse long staple variety, is grown in the central coast area and from this variety selections have been made for resistance to *Verticillium* wilt.

Disease problems vary with climatic and soil conditions prevailing in the different cotton-growing areas. In the central coast area, *Verticillium* wilt, black root rot, powdery mildew and leaf spots are prevalent, whereas in the north bacterial blight and *Alternaria* leaf spot are more important. Damping-off is a common disease in both areas.

### Verticillium wilt

*Verticillium* wilt (*Verticillium albo-atrum*) occurs only in the central coast area and is among the most important diseases of cotton.

The disease first appeared in Peru at the beginning of this century, and its disastrous effect on cotton yield nearly ruined the industry. The spread of the disease resulted in a gradual reduction in cotton production, especially in some parts of the central and south coast areas. The cultivation of this crop was saved only through the arduous effort of a farmer, Fermin Tangüis, who, by selecting resistant plants from cotton growing in severely infested soil, succeeded in developing a variety highly resistant to wilt. This variety, named after him, is now widely grown in Peru.

In recent years both the La Molina Agricultural Experiment Station and the Experiment Station of the Agricultural Association of Cañete have developed improved wilt-resistant varieties, such as L. M. W. 395-42, L. M. W. I-52, Cñ. W. 179-56 and Cñ. W. 180-56.

### Black root rot

*Thielaviopsis basicola* causes root rot mainly in the first and second ratoon cotton crops but it also attacks younger plants. The infection may result in complete defoliation and the center of main roots usually turns dark wine colored.

Recently it has been demonstrated that black root rot occurs always in association with nematode infection. This *Thielaviopsis*-nematode complex is causing heavy losses. For the control of this disease, the application of large quantities of organic matter such as stable and green manure is recommended. The development of resistant varieties should be attempted.

### Nematodes root diseases

This serious problem in cotton cultivation has not received much attention until very recently. The main species of nematodes involved are *Meloidogyne incognita* var. *acrita* and *Pratylenchus* sp. In addition to cotton, these nematodes infect a large number of crop plants, such as beans, tomatoes, potatoes and fruit trees, especially peaches.

It was previously believed that the nematodes were most important on ratoon cotton plants and in association with *Verticillium albo-atrum* and *Thielaviopsis basicola*. Recent observations, however, showed that in certain areas they seriously affected one-year-old plants without the presence of any fungi.

Cotton plants affected by nematodes are dwarfed, have smaller coriaceous leaves with

margins discolored and turned upward, and appear generally similar to plants suffering from water deficiency. Under weather conditions unfavorable to cotton growth or during droughts, bolls wither prematurely but remain attached to stems. At an early stage of nematode infection, rootlets proliferate around the points of infection but soon die successively until the roots are completely devoid of rootlets. The injurious effects on roots are particularly profound when parasitic fungi are in association with nematodes. Only under favorable conditions, the regeneration of rootlets can take place to prevent injury to aerial parts. Root galls are developed when *Meloidogyne* is the pathogene.

For the control of the nematode disease or the nematode-*Verticillium* or *Thielaviopsis* complex, it is recommended to eliminate ratoon crops, to use stable manure or green manure such as *Crotalaria* and velvet beans, to adopt crop rotation including grasses, and to use resistant varieties. The Experimental Station of the Farmers' Association of Cañete has been distributing seeds of varieties resistant to the nematode-*Thielaviopsis* complex since 1951. Among these varieties, Cñ. 601-51 and Cñ. 70-51 prove to be satisfactory.

### Bacterial blight

Occurrence of bacterial blight (*Xanthomonas malvacearum*) is restricted to the north coast and northeastern forest area. On the coast, in the Department of Piura, it causes serious losses in the upper parts of Piura and Chira valleys during the rainy season from January to April, when the rainfall totals 280 millimeters. The infection damages the early formed bolls on the lower part of the plant. When the rainy season is over, the plants recover and produce normal bolls on the middle and upper parts. In 1959, the use of sprinkler irrigation in one farm resulted in a complete failure of the crop because it extended the conditions favorable to disease development. Fields which receive a great amount of water from sprinkler irrigation usually suffer heavier losses from bacterial blight.

In the lower parts of these valleys, with only 40 millimeters of rainfall from January to April,

bacterial blight occurs practically only on cottedons and does not spread to established plants.

In contravention of quarantine regulations, seed infected with bacterial blight was introduced during the 1959/60 season from the northern part of the country into the disease-free central and southern parts. As a result, bacterial blight appeared in all fields where the introduced seed was sown and it became necessary to enact a special decree to enforce the eradication of the infected crop.

### Powdery mildew

Powdery mildew (*Erysiphe malachre*; conidial stage *Ovulcriopsis gossypii*) was first identified and recorded by Abbott.<sup>1</sup> The fungus growth is more prevalent on the lower surface of the leaf, though at the later stage of development it usually covers the whole leaf. Severe infection causes yellowing of the leaves and defoliation, with consequent reduction in yield.

In accordance with Abbott, although it occurs in all cotton-growing areas along the coast, the powdery mildew has no economic significance, as it infects cotton plants only at the end of the growing season. In 1951, however, it became a serious disease in the valleys of the central coast and sulfur dusting had to be applied for its control. This outbreak continued for only two years in the Cañete valley, but in other valleys, especially Pisco and Casma, it has become permanently established and is now a perennial problem.

Measures for controlling powdery mildew must be preventive and should be taken when less than 10 percent of the plants have become affected.

### Damping-off

Damping-off caused by *Rhizoctonia solani* occurs wherever cotton is grown, and under favorable conditions it can cause serious damage. Before 1953 mercury fungicides were used to control the disease. More recently, based on

<sup>1</sup> ABBOTT, E. V. 1932. A powdery mildew on cotton. *Myologia* 24: 4-6.

results of experiments conducted in the Carabayllo valley, 75 percent technical grade pentachloronitrobenzene and 10 percent methyl-arsenic sulphide have been recommended and have given excellent results.

### Leaf spots

*Alternaria tenuis*, *Macrosporium nigricantium*, *Cercospora gossypina*, *Helminthosporium gossypii*, and *Phyllosticta* sp. have been identified as the causal agents of cotton leaf spots. *Phyllosticta* sp. was found only in Bagua in the northwestern tropical forest area.

Leaf spot caused by *Alternaria tenuis* appears to be most important. In the central coast area the same fungus causes seedling blight, whereas in the north it occurs mainly on established plants. Seedling infection takes place either in early sown fields or when temperature is low

and air humidity high, resulting in retarded growth or even killing the seedlings.

Leaf spots may be controlled with a spray of 0.25 percent maneb or zineb at the early stage of disease development.

### Fomes

During the 1959/60 growing season, a disease apparently hitherto unrecorded was examined for the first time, although the farmers have known it under the name of *Enfermedad de la mesa o vaso* for five or six years. The disease occurred sporadically on land that was previously planted with fruit or forest trees and inflicted sudden death of ratoon cotton plants in full productivity. The affected plants show at the collar fructifications of a fungus belonging to the genus *Fomes*. It was recommended to uproot and burn the diseased plants in order to prevent its dissemination.

## OUTBREAKS AND NEW RECORDS

## PAKISTAN

A.S.K. Ghowri and Hafiz Ahmad, Department of Plant Protection, Karachi

**Swarming of *Hieroglyphus nigrorepletus***

*Hieroglyphus nigrorepletus* Bolivar (Orthoptera, Acrididae) is widely distributed in Africa and Asia and is an important pest of paddy, sugar cane, hemp, maize and sorghum in the Indo-Pakistan subcontinent. It has two distinct forms; one brachypterous and common, the other macropterous and occurring only occasionally. A brief account is given of the swarming of this species, which is recorded for the first time.

## SWARM ACTIVITIES

On the morning of 20 August 1959, a medium-sized swarm of locusts passed over the Research Station of the Department of Plant Protection at Malir (West Pakistan). Part of the swarm settled down, and the rest continued to fly eastward. About 500 specimens were collected, and all of them were identified as the macropterous form of *Hieroglyphus nigrorepletus*. Further observations confirmed that the entire swarm consisted of this species. The next day more swarmlets invaded the research station, and reports of their appearance were also received from other parts of Karachi. Swarms travelled northwest from Karachi, and at Bela a population of 15 to 20 per square foot was recorded. The invasion of the flying swarmlets lasted for about seven days in Bela, Karachi, Malir, Thatta and parts of Hyderabad.

## OUTBREAK AREAS

The age and movements of the swarms indicated that they originated from somewhere not far from Karachi. The cultivated and waste-

lands around Karachi, Bela, Malir, Thatta and Hyderabad were examined. Although the exact breeding grounds could not be determined, the general conditions of this arid region, situated at latitudes 24-27° N. and longitudes 66-71° E., could be favorable to transformation of the non-swarming grasshoppers into swarming populations.

## EFFECT OF RAINFALL

According to Roonwal,<sup>1</sup> *Hieroglyphus nigrorepletus* undergoes one generation each year. Eggs are laid in the soil during August and September, and hatching takes place during the following June or July soon after the first showers. The rains in June and July are therefore important, because, if these two months were dry, a large percentage of the eggs would fail to hatch. On the whole, early and uniformly distributed summer rains create favorable conditions for this species. The summer rains of 1959 in the outbreak areas were early, uniformly distributed, and the heaviest during the last ten years, being about 22.6 and 12.6 inches (57.5 and 32 centimeters) respectively in Karachi and Hyderabad. During the previous years the annual averages of the summer rainfall were about 8 and 6 inches (20 and 15 centimeters) respectively for these two localities. The total rainfall in 1959 for Karachi and Hyderabad was 26 and 16 inches (66 and 40.5 centimeters) respectively.

<sup>1</sup> ROONWAL, M. L. 1945. Notes on the bionomics of *Hieroglyphus nigrorepletus* Bolivar (Orthoptera, Acrididae) at Benares, United Provinces, India. *Bull. Ent. Res.* 36: 339-341.

## MACROPTERISM

The swarming of *Hieroglyphus nigrorepletus* in the Lower Indus valley, besides being a phenomenon of great ecological significance, is a warning on the potential future plagues of this

grasshopper species, especially because the reclamation of the desert in West Pakistan extends continuously the areas favorable to its breeding and development. Further studies will be desirable to determine the causes of its swarming.

## UNITED STATES

Plant Pest Control Division, Agricultural Research Service,  
United States Department of Agriculture

## OCCURRENCE OF ORIENTAL FRUIT FLY

During the week of 24-29 July 1960 a single adult female oriental fruit fly (*Dacus dorsalis*) was trapped in Anaheim, Orange County, California. This is the first record of the oriental fruit fly in the continental United States. The insect was taken in a McPhail trap baited with SPIB-7 (Staley's Protein Insecticide Bait No. 7) which had been hung in an orange tree in a citrus grove. Additional traps were placed immediately throughout a 25-square-mile area

surrounding the property on which the insect was found. Intensive trapping over a large area by county, state, and federal agencies has been put into operation to supplement the several thousand fruit fly traps which are operated annually in a fruit fly detection program in the State of California.

As of 29 August no additional finds of this insect have been reported and there is no evidence indicating that the insect has become established in California.

## PLANT QUARANTINE ANNOUNCEMENTS

## GREECE

Royal Decree of 19 February 1959, published in the *Ephemeris tes Kuberneseos* No. 42 on 6 March 1959, revokes Decree of 18 December 1954 governing the importation of plants and plant products (see *FAO Plant Prot. Bull.* 3: 189-191, 1955).

## Importation prohibited from any source

The following materials from any source may not land in Greece for importation or transit.

1. Plants, parts of plants, plant products and their packing materials infected or infested with any diseases or pests.
2. Living pests in any stage of development, cultures of plant pathogens, except those imported for scientific purposes under permit of the Plant Protection Service.
3. Packing material previously used for transportation of plants or parts of plants.
4. Manures of plant or animal origin, mixtures of such manures, compost and soil, gravel and sand containing soil.

## Importation prohibited from certain countries

The following restrictions apply also to consignments in transit.

1. Plants and plant products from Texas, United States, where destructive viruses and *Phymatotrichum omnivorum* occur.
2. Citrus plants and fruits from countries where tristeza, xyloporosis or other virus diseases occur. Imports from other countries must be accompanied by a certificate stating that these diseases do not occur in the country of origin.
3. Potatoes for consumption from countries where Colorado beetle (*Leptinotarsa decemlineata*) or wart (*Synchytrium endobioticum*) occur. Imports from other countries must be accompanied by a certificate stating

that Colorado beetle and wart do not occur in the country of origin.

4. Cotton seed for planting from certain states of the United States of America and any other country where *Glomerella gossypii* occurs. Imports from other countries must be accompanied by a certificate stating that this disease does not occur in the country of origin.
5. Grapevine plants and alfalfa seed from California, Texas and Florida, in the United States of America, and Argentina, where Alfalfa dwarf virus causing Pierce's disease of grapevine occurs.
6. Tobacco seed from Brazil, the United States of America, Argentina and Australia, where *Peronospora tabacina* occurs.

## Seed potatoes

Importation is permitted under the following conditions, after permission has been granted by the Ministry of Agriculture.

1. Seed potatoes must be free from soil, packed in new packing material and sealed officially with lead in the country of origin.
2. On inspection the tubers must be found free from *Leptinotarsa decemlineata*, *Phthorimaea operculella*, *Synchytrium endobioticum*, *Fusarium* sp., *Pseudomonas solanacearum*, *Corynebacterium sepedonicum*, viruses, and *Heterodera rostochiensis* (including cyst). The phytosanitary certificate accompanying the shipment must also indicate freedom from these pests and diseases. Tubers affected by *Actinomyces* sp., *Spongopora subterranea*, *Rhizoctonia solani* and *Oospora pustulans* must not exceed 10 percent by weight and 5 percent of surface area. Buds of the tubers must be free from these fungi. Tubers affected by *Bacillus phytophthorus* and *Phytophthora* sp. must not exceed 4 percent in weight.

3. Seed potatoes must have been grown in fields at least 10 kilometers away from fields infested with *Leptinotarsa decemlineata* and *Synchytrium endobioticum*.
4. Seed potatoes and the inside of their packings imported from 1 March to 15 November must have been dusted with a 10 percent DDT dust or another approved pesticide.
5. Authorized points of entry are :
  - (a) Indomene and Sidirokastron by rail ;
  - (b) Piraeus, Eleusis, Chalkis, Volos, Salonika, Patras, Chania and Heraklion by sea ;
  - (c) Athens and Salonika by air.

### Seeds

Importation of seeds listed below, except those from countries specifically prohibited, is permitted under the conditions prescribed.

1. Cotton seed for planting may be imported by cotton organizations through the ports of Piraeus and Eleusis after permission has been granted by the Ministry of Agriculture. On inspection they must be found free from *Anthonomus grandis*, *A. vestitus*, *Prodenia litura*, *Earias insulana*, *Glomerella gossypii*, *Diplodia gossypina* and *Peronospora gossypina*. Freedom from these pests and diseases must also be indicated on the phytosanitary certificate accompanying the consignment. Furthermore, the seed must have been delinted with sulfuric acid in the exporting country and disinfected on arrival by the cotton organization in a prescribed manner.
2. Seeds for planting may be imported through the customs of Athens, Elliniko, Piraeus, Eleusis, Patras, Heraklion, Volos and Salonika if they are found to be healthy and free from *Cuscuta* and *Orobanche*. Each consignment should be accompanied by a certificate indicating that the seeds are in a healthy condition and that they originate from plants free from virus diseases.

Forage seed must be covered by an import permit issued by the Ministry of Agri-

culture, but on the certificate the statement regarding virus diseases is not required.

3. Seeds for consumption may be imported through any customs if they are accompanied by a certificate of the country of origin and found to be free from pests and diseases.

### Fruits and vegetables

Fruits and vegetables must be imported, except those from Texas in the United States, through the customs mentioned under seeds for planting. On inspection they must be found free from harmful pests and diseases, especially *Quadraspidiotus perniciosus*, *Diaspis pentagona*, *Ceratitis capitata*, *Laspeyresia molesta*, and mites.

Citrus fruits may be imported only if they originate from countries where tristeza, xyloporosis and *Phyllocoptruta oleivorus* do not occur.

Each consignment must be accompanied by a certificate indicating freedom from named pests and diseases.

Small quantities of fruits and vegetables up to 100 kilograms, carried by travelers or sent by mail, are exempt from certificate requirements but subject to inspection.

### Ornamental plants and flowers

Ornamental plants and flowers, except those from Texas, in the United States, may be imported through the customs mentioned under seeds for planting, except Eleusis. Those listed below must be free from the named pests and diseases and accompanied by an official certificate of the country of origin, stating that they fulfil the requirements mentioned. Small quantities of bulbs, tubers, roots, rhizomes and small flower bouquets up to 5 kilograms, carried by travelers or sent by mail, do not require certificate but are subject to inspection.

1. Ornamental plants with or without roots (without soil attached) must be free from *Quadraspidiotus perniciosus*, *Diaspis pentagona* and *Lepidosaphes gloveri*.

Rose bushes, in addition, must not be infected by *Diplocarpon rosae*, *Coniothyrium wernsdorffiae*, and *Leptosphaeria coniothyrium*.

2. Rooted Chrysanthemum plants, without soil attached, must be free from *Diarthronomyia chrysanthemi*, *Quadraspidiotus perniciosus*, and *Diapsis pentagona*.
3. Bulbs, tubers, roots and rhizomes of ornamentals must be free from *Leptinotarsa decemlineata*, *Brachycerus undatus*, *B. algirus*, *Merodon* sp., *Eumerus* sp., *Rhizoglyphus echinopus*, *Xanthomonas hyacinthi* and *Tylenchus dipsaci*.

Furthermore, infection by *Sclerotinia bulborum*, *S. gladioli*, *Sclerotium tuliparum*, *Botrytis tulipae*, *B. narcissicola*, *B. gladioli*, and *Septoria gladioli* should not exceed 5 percent.

Dahlia tubers, in addition, must be free from *Pseudomonas solanacearum*.

The bulbs, tubers, roots and rhizomes and the inside of their packings must be dusted with a 10 percent DDT powder or another approved pesticide.

4. Fresh flowers must be free from *Quadraspidiotus perniciosus* and *Diaspis pentagona*.

#### Forest trees

Consignments of forest trees must be accompanied by phytosanitary certificates issued by the country of origin.

1. Young forest plants may be imported through the customs of Piraeus and Elliniko, if they have been found free from *Porthetria dispar*, *Nygmia phaeorrhoea*, *Dendrolimus pini*, *Lymantria monacha*, *Hyphantria cunea* and *Rhabdocline pseudotsugae*.
2. Chestnut trees and fresh or dry chestnut timber may be imported only if they are free from *Endothia parasitica*. As an exception, dry chestnut timber may be imported from infested countries if it has been treated by an approved method. Consignments of chestnut trees or products must be accompanied by certificates to the above-mentioned effects.
3. New chestnut casks may be imported through ports where there are no chestnut trees in the vicinity, if they are to be re-exported after filling. Importation of used casks is not restricted.

#### Importation by institutes and agronomists

Nursery seedlings of ornamental and economic plants, budwood and other rooted or non-rooted propagation material without earth ball may be imported for investigation purposes from Europe, the Mediterranean countries, and North America (except Texas), by government institutions, agricultural schools and organizations, and agriculturists, as well as proprietors or managers of nurseries. Such imports must be covered by a permit issued in advance by the Ministry of Agriculture and the Plant Protection Service, prescribing phytosanitary requirements. They must be accompanied by an official certificate attesting freedom from the named diseases and compliance with requirements prescribed. They may be introduced through the customs listed under seeds for planting and are subject to fumigation. The materials must be free from diseases and pests, especially *Quadraspidiotus perniciosus*, *Diaspis pentagona* and *Lepidosaphes gloveri*.

Under these provisions, plants, cuttings and rhizomes of the following crops may be introduced, provided they are free from the named pests and diseases.

1. Sugar cane and bamboo of all kinds: Nematodes, *Aleurodes* spp., *Thielaviopsis paradoxa*, Fiji and other virus diseases.
2. Hops: *Pseudoperonospora humuli* and virus diseases.
3. Other crop plants: harmful pests and diseases, including virus diseases.

Grapevine plants with or without roots may be imported under a permit issued by the Phylloxera Council and in compliance with the quarantine requirements.

#### Imports for scientific purposes

Importation of any plants, with or without soil, for scientific purposes by agricultural institutions and schools is permitted through the customs of Piraeus, Athens and Elliniko, after permission has been granted by the Ministry of Agriculture and the Plant Protection Service. The plants must be free from pests and diseases and accompanied by an official certificate attest-

ing that they fulfil the prescribed requirements. They are subject to fumigation or other treatments. Plants imported from countries infested with pests and diseases not found in Greece must be grown for one to three years under observation in special fields.

### **Dry fruits**

Edible dry fruits may be imported if they are found free from harmful pests and diseases. They are subject to fumigation and must be accompanied by a certificate of the country of origin, indicating freedom from diseases and pests. For small quantities carried by travelers or sent by mail no certificate is required but they are subject to inspection.

### **Imports into phylloxera-free regions**

Plants, whose importation is permitted under the decree, may be imported by private importers only into phylloxera-infested regions. Importation of plants by private persons into phylloxera-free regions is governed by the Phylloxera Regulation (see *FAO Plant Prot. Bull.* 2: 173-174. 1955).

### **Imports without restriction**

Plant materials not mentioned in the decree may be imported if they are free from soil and found to be free from harmful pests and diseases.

### **Phytosanitary certificates**

Certificates are required for importation of plants and plant materials listed in the decree. The certificate must indicate the number and weight of packages, identification marks, variety, country and place of origin, and names of exporter and consignee. The certificates, which should be in triplicate, in the language of the country of origin and in French or English or officially translated into Greek, must be issued within 20 days from the date of shipment.

### **REPUBLIC OF THE PHILIPPINES**

Administrative Order No. 7 (revised) of 29 October 1959, published in the *Official Gazette* Vol. 56, No. 2, on 11 January 1960, concerns the importation of living animals.

Importation is prohibited for any purpose of living insects in any stage, birds, bats, reptiles, crustaceans, mollusks, mammals or other animals not falling within the scope of the term "domestic animals" as defined in Act No. 3639, except under permit issued by the Director of Plant Industry. Such animals may be introduced only through the port of Manila, where they will be subject to inspection and treatments to preclude the introduction of organisms harmful to agriculture.

All animals imported under this order must be free from injurious pests and diseases, and must not be accompanied by noxious weeds, seeds, or plant materials likely to become weeds or harbor plant pests and diseases.

## GRASS COVER OF AFRICA

FAO Agricultural Studies No. 49

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This important work is actually a summary in map form of the extent of present knowledge of the grass cover of Africa which can be used as a guide not only in the field of range or grassland management, but also in the wider reaches of land use generally. Included with 143 pages of text is a six-color 1 : 10,000,000 map in separate folder of Africa's grass cover as compiled from discussions and correspondence with a great number of specialists in Africa and elsewhere.

Textually, the study deals with ecological relationships of Africa's grass cover and types of vegetation with which such cover is associated. Twenty-three genera used to distinguish the various associations are also discussed, as well as types of the grass cover itself. There are a number of appendixes, including an index of African grass cover types and their geographical distribution.

Publication of this study has resulted from a decision by FAO to map the grass cover of Africa first, and then to use the experience and technique so gained to prepare maps of other parts of the world. It represents a first step forward toward the long-term objective of mapping the grazing resources of the world's underdeveloped countries on some basis of value to those concerned with the improvement of grassland management and the livestock industries dependent on them.

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